State of Hawaii
Department of Health

Child and Adolescent Mental Health Division

Child Status Measurement: System Performance Improvements During Fiscal Years 2002 - 2004

Prepared by
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For the Period of July 1, 2001 to June 30, 2004
Version 9-28-2004

Abstract

The present study examined whether the rate of child improvement or the proportion of youth demonstrating an improving trend have increased between July 1, 2001 and June 30, 2004. Results indicated that youth served more recently were improving at a significantly greater rate than youth served earlier in the study period. This increase was evident across parent, teacher, and clinician report measures of functioning, service need, and symptomatology. The proportion of youth showing improvement also increased across the study period on adult report measures of functioning and symptomatology, but not service need. Improvement rate remained stable throughout the study period on a youth reported measure of symptomatology. Although this study did not examine causal mechanisms of change, these findings are consistent with the conclusion that efforts to implement evidence-based services, develop care coordination practice, increase information feedback to stakeholders, adopt statewide performance measures, restructure quality improvement and practice-focused performance management processes, and improve utilization management are meeting with success.

Introduction

During the period from July 1, 2001 to June 30, 2004, the Hawaii Child and Adolescent Mental Health Division (CAMHD) was actively developing its internal evaluation system and actively implementing a wide array of system performance improvement initiatives. These initiatives included (a) dissemination of evidence-based services and practice guidelines, (b) ongoing training, mentoring and supervision in care coordination practices, (c) building clinical and administrative reporting systems, (d) adopting performance measures system-wide, (e) restructuring quality improvement and practice-focused performance management processes, and (f) improving clinical review and utilization management. The purpose of the present paper is to provide a global analysis using the new evaluation tools measuring child status to explore whether notable changes in child functioning, service needs, and symptomatology coincided with these system reforms. Specifically, this study examined whether the question "Did the proportion of youth demonstrating improvement or the average rate of improvement differ across the fiscal quarters during the study period?" This manuscript continues a series of studies that have focused on understanding and improving child status measures (Daleiden, 2004a, 2004b; Daleiden, Brogan, & Arensdorf, 2003) and analyzing child outcomes in the CAMHD system (Daleiden, 2002, 2003; Hawaii Departments of Education and Health, 2004).

Youth functioning was measured using the Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 1998). The CAFAS is a 200-item clinician report scale that measures level of functional impairment. Based on their knowledge and experience with the child, raters review behavioral descriptions ordered by level of impairment within eight domains of functioning. The subscales of School Role Performance, Home Role Performance, Community Role Performance, Behavior Toward Others, Mood/Emotions, Mood/Self-Harmful Behavior, Substance Use, and Thinking are calculated by scoring the

highest level of impairment (i.e., severe = 30, moderate = 20, mild = 10, no/minimal = 0) endorsed within the respective domain of items. The eight-scale total score was examined in the present study.

The service needs of youth were measured using the Child and Adolescent Level of Care Utilization System (CALOCUS; American Academy of Child and Adolescent Psychiatry & American Association of Community Psychiatrists, 1999). The CALOCUS was developed as a tool to aid treatment teams in understanding youth and family service needs and in selecting a treatment setting appropriate to those needs. The CALOCUS requires clinicians to make dimensional ratings on a five-point scale in the domains of risk of harm, functional status, comorbidity, environmental stress, environmental support, resiliency and treatment history, child treatment acceptance and engagement, and parent treatment acceptance and engagement. These ratings may be summed to yield a total score, but are also combined through a detailed algorithm into a level of care judgment. The seven level of care categories are basic services (Level 0), recovery maintenance and health management (Level 1), outpatient services (Level 2), intensive outpatient services (Level 3), intensive integrated service without 24-hour medical monitoring (Level 4), non-secure, 24-hour, medically monitored services (Level 5), and secure, 24-hour, medically managed services (Level 6). The total score was examined in the present study.

Youth symptomatology was measured using the parent, teacher, and youth report forms of the Achenbach System of Empirically Based Assessment (Achenbach & Rescorla, 2001). The ASEBA is a behavior problem checklist that includes total problem, broadband problems, problem syndrome, and competence scales. The problem domains assessed vary slightly across versions for different reporters, but include a total problem scale, internalizing, and externalizing broadband scales, and the syndrome scales of withdrawn behavior, somatic complaints, anxious/depressed behavior, delinquent behavior, aggressive behavior, social problems, thought problems, and attention problems. The total problem T-score was examined in the present study.

The present study focused on the rate and direction of change within individuals during their service episodes. This study investigated whether the rate of change and the proportion of youth demonstrating improvement differed across the fiscal quarters of the study period. Fiscal quarter were used to provide adequate sample sizes for each time period, and because the child status measures were scheduled to be administered on a quarterly basis.

Method

Participants

Participants for this study included all youth who were registered with CAMHD for one or more days and received at least two valid child status assessments within a single service episode during the period from July 1, 2001 to June 30, 2004. Due to differential completion rates across measures (cf., Daleiden, Brogan, & Arensdorf, 2002), different samples were available for each measure. Further, due to the ongoing flow of youth through the system (i.e., admissions and discharges), different sample sizes were

available for each fiscal quarter. Figure 1 presents the sample sizes for the CAFAS, CALOCUS, CBCL, TRF, and YSR measures over the study period.

For the adult report measures, sample sizes were increasing during the first four to five quarters and then stabilized later in the study period. This pattern is consistent with active development of these measurement systems during fiscal year 2002. Further, large system-wide restructuring was occurring during this period that involved transferring less intensive services and services to youth with pervasive developmental disorders to the Department of Education's School Based Behavioral Health program (cf., Daleiden, 2003). To help address potential biases associated with this restructuring, youth who were discharged to the Department of Education and who did not return for subsequent CAMHD services were excluded from the sample. Implementation of the youth report measure lagged behind the adult measure and was increasing throughout the first nine quarters of the study period, and was just beginning to show signs of stabilizing. Taken together, these sample size are consistent with evidence that during the study period, the completion rates for these measures have increased (Daleiden et al., 2003), that the overall CAMHD population has decreased (Daleiden, 2003), and that these trends are showing signs of stabilizing. Quarterly completion rates for the CAFAS and CALOCUS are much higher than those for the ASEBA (Daleiden et al., 2003, Daleiden, 2004b).

Materials

ASEBA Child Behavior Checklist (CBCL; Achenbach, 1991a; Achenbach & Rescorla, 2001). The CBCL is a 113-item child behavior problem checklist completed by parents, parent-surrogates, or others who know the children in family-like settings. Respondents are asked to rate items on a three-point scale from "not true" to "very true or very often" that describe a youth "now or within the past 6 months." It provides total, broadband, syndrome, and competence scales. The broadband problem scales measure an internalizing factor and an externalizing factor. The syndrome scales measure withdrawn behavior, somatic complaints, anxious/depressed behavior, delinquent/rule-breaking behavior, aggressive behavior, social problems, thought problems, and attention problems. The competence scales assess school, activity, and social competence. Raw scores and T-scores (Mean = 50, SD = 10) based on gender and age groups from the standardization sample are available. Achenbach (1991a) reported acceptable internal consistency (α = .90 internalizing, α = .93 externalizing) and test-retest reliability (one-week r = .89, .93; one-year r = .79, .87; two-year r = .70, .86) for the CBCL. Achenbach (1991a) also reviewed numerous studies supporting the validity of the CBCL relative to other parent-report behavior checklists, clinic-referral status, and categorical psychiatric diagnosis. T-scores were used in all analyses. Achenbach & Rescorla (2001) reported internal consistency (α = .90 - .92 broadband, α = .82 - .92 syndrome, α = .82 - .93 competence), parent agreement (r = .72 - .85 broadband, r = .65 - .85 syndrome, r = .57 - .76 competence), 8-day test-retest reliability (r = .91 - .92 broadband, r = .67 - .88 syndrome, r = .83 - .91 competence), 12-month stability (r = .80 - .82

broadband, r = .64 - .82 syndrome, r = .62 - .76 competence), and 24-month stability (r = .70 - .82 broadband, r = .56 - .81 syndrome, r = .43 - .73 competence) for the CBCL. The ASEBA information is collected on optical scan forms that are sent via state courier to the CAMHD Management Information System (MIS) office for processing and uploading to the Child and Adolescent Mental Health Management Information System (CAMHMIS).

ASEBA Teacher Report Form (TRF; Achenbach, 1991b; Achenbach & Rescorla, 2001). The TRF is a 113-item behavior problem checklist that is completed by teachers or school personnel who know the child in school-like settings. Respondents are asked to rate items on a three-point scale from "not true" to "very true or very often" that describe a pupil "now or within the past 2 months." It provides total, broadband, syndrome, and competence scales. The broadband problem scales measure an internalizing factor and an externalizing factor. The syndrome scales measure withdrawn behavior, somatic complaints, anxious/depressed behavior, delinquent/rule-breaking behavior, aggressive behavior, social problems, thought problems, and attention problems. The TRF competence (a.k.a. adaptive functioning) assessment differ from the other ASEBA forms and yields the following scales: academic performance, working hard, behaving appropriately, learning, and happy. Raw scores and T-scores (Mean = 50, SD = 10) based on gender and age groups from the standardization sample are available. Achenbach & Rescorla (2001) reported internal consistency (α = .90 - .95 broadband, α = .72 - .95 syndrome, α = .90 total adaptive functioning), teacher agreement (r = .58 - .69 broadband, r = .28 - .69 syndrome, r = .37 - .58 competence), 16-day test-retest reliability (r = .86 - .89 broadband, r = .60 - .96 syndrome, r = .78 - .93 competence), 4-month stability (r = .48 - .69 broadband, r = .38 - .84 syndrome) for the TRF.

ASEBA Youth Self-Report (YSR; Achenbach, 1991c; Achenbach & Rescorla, 2001). The YSR is a 112-item behavior problem checklist that is completed by youth between 11 and 18 years of age. Respondents are asked to rate items on a three-point scale from "not true" to "very true or very often" that describe themselves "now or within the past 6 months." It provides total, broadband, syndrome, and competence scales. The broadband problem scales measure an internalizing factor and an externalizing factor. The narrowband problem scales measure the following dimensions: withdrawn behavior, somatic complaints, anxious/depressed behavior, delinquent/rule-breaking behavior, aggressive behavior, social problems, thought problems, and attention problems. Raw scores and T-scores (Mean = 50, SD = 10) based on gender and age groups from the standardization sample are available. The YSR competence scales measure activity and social competence, but not school competence. Achenbach & Rescorla (2001) reported internal consistency (α = .90 broadband, α = .71 - .90 syndrome, α = .55 - .75 competence), 8-day test-retest reliability (r = .80 - .89 broadband, r = .67 - .88 syndrome, r = .83 - .91

competence), and 7-month stability (r = .53 - .59 broadband, r = .36 - .63 syndrome, r = .43 - .59 competence) for the YSR.

Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 1998). The CAFAS is a 200-item clinician report scale that measures youth's level of functional impairment. Based on their knowledge and experience with the child, raters review behavioral descriptions ordered by level of impairment within eight domains of functioning. The subscales of School Role Performance, Home Role Performance, Community Role Performance, Behavior Toward Others, Mood/Emotions, Mood/Self-Harmful Behavior, Substance Use, and Thinking are calculated by scoring the highest level of impairment (i.e., severe = 30, moderate = 20, mild = 10, no/minimal = 0) endorsed within the respective domain of items. An eight-scale total score is calculated by summing across the eight subscales, whereas a five-scale total is calculate by summing the raw scores from behavior, substance use, and thinking scales with the maximum score from the school, home, and community role performance scales and with the maximum score from the emotions and self-harm. The CAFAS has been found to have acceptable internal consistency across items, inter-rater reliability across sites, and stability across time (Hodges, 1995; Hodges & Wong, 1996). Studies of concurrent validity have found that CAFAS scores are related to severity of psychiatric diagnosis, intensity of care provided, restrictiveness of living settings, juvenile justice involvement, social relationship difficulties, school-related problems, and risk factors. Studies of predictive validity have found that CAFAS scores from intake assessments predict service utilization and cost for services. Care coordinators serve as the primary raters for the CAFAS and results are entered directly into a networked computer scoring program by care coordinators or statistics clerks.

Child and Adolescent Level of Care Utilization System (American Academy of Child and Adolescent Psychiatry & American Association of Community Psychiatrists, 1999). The CALOCUS is a clinician rating form. Clinicians make dimensional ratings on a five-point scale in the domains of risk of harm, functional status, comorbidity, environmental stress, environmental support, resiliency and treatment history, child treatment acceptance and engagement, and parent treatment acceptance and engagement. These ratings may be summed to yield a total score, but are also combined through a detailed algorithm into a level of care judgment into one of seven categories: basic services (Level 0), recovery maintenance and health management (Level 1), outpatient services (Level 2), intensive outpatient services (Level 3), intensive integrated service without 24-hour medical monitoring (Level 4), non-secure, 24-hour, medically monitored services (Level 5), and secure, 24-hour, medically managed services. Preliminary reliability (Ted Fallon, 2002, personal communication) indicated that intrajudge agreement based on clinical vignettes ranged from ICC (2,2) = .57 - .95 across scales with all scales above .70 except for environmental stress and child treatment

acceptance and engagement. Preliminary validity analysis found that the CALOCUS total score correlated -.33 with the Child Global Assessment of Scale (CGAS) and .62 with the CAFAS eight-scale total score. Care coordinators serve as the primary raters for the CALOCUS and results are entered directly into a networked computer scoring program by care coordinators or statistics clerks.

Daleiden (2004) recently examined the operating characteristics of the CALOCUS and the CAFAS in the Hawaii system. Findings indicated that both measures yielded relatively stable scores over short periods and that stability decreased in a generally linear fashion as the time lag between measurements increased. Results generally supported the concurrent and predictive validity of these measures in relation to each other and in relation to service utilization and service cost. The CAFAS and CALOCUS provided both common and unique information. The CAFAS uniquely contributed to the prediction of service intensity (e.g., total service hours), whereas the CALOCUS made a unique contribution to the prediction of service restrictiveness (e.g., proportion of service hours provided in out-of-home settings), and both the CAFAS and the CALOCUS made independent unique contributions to the prediction of future service costs. These findings supported the use of the CAFAS and CALOCUS by CAMHD.

Procedures

Care coordinators are responsible for arranging for completion of the CAFAS, CALOCUS, and ASEBA measures as part of routine case management. All measures were expected to be completed quarterly. In addition, psychiatrists or clinical psychologists may also request or administer the measures on an as-needed basis or in conjunction with mental health evaluations. To provide timely feedback, promote data accuracy, and facilitate clinical use of these assessments, CAMHD maintains an on-demand clinical reporting system that provides a complete historical record of service and child status information in a user-friendly graphical format. To promote inter-rater reliability for measures, CAMHD maintains an on-going training program. Users of the instruments are required to annually update their certification in these measures. The annual certification includes training to mastery with respect to reliability criteria in relation to benchmark ratings.

Data Analysis

Two dependent variables were calculated for each study measure. Both dependent variables were based on calculation of the within client slope during a target service episode. The target service episode was defined as the most recent episode in which a youth was registered for one or more days during the quarter of interest. Upon identification of a target episode, a linear slope was calculated using all child status assessments administered during that episode through the end of the reporting quarter. Specifically, the number of months since the episode admission date was used to predict

the scores on each child status measures. The resulting within client slope, which represented the average change on the measure per month of service, was used as the first dependent variable. Next, an indicator variable was constructed to identify whether these slopes demonstrated an improving trend (i.e., were negative) or a stable or deteriorating trend (i.e., were greater than or equal to zero). Thus, when aggregated across youth, the first dependent variable provided an indication of the average improvement per month and the second dependent variable signified the proportion of youth with showing a trend toward improvement.

To examine change across fiscal quarters, second level linear regression analyses were performed predicting the preceding dependent variables from time measured as fiscal quarters. These analyses tested whether the rate of change (dependent variable #1) or the proportion of youth showing improvement (dependent variable #2) significantly differed across the study period. It is important to note that this two-step analysis does not completely represent the complex error structure of these nested variables as could be accomplished by hierarchical multilevel modeling. This may lead to misestimating standard errors. This error misestimation is expected to reduce the precision of significance tests, but is not expected to alter the observed pattern of findings. Nevertheless, this analysis should be viewed as a "rough and ready" analysis of changes in child status over the years. A 95% confidence level was used for all analyses.

Results

Average Monthly Rate of Change

The first set of analyses examined the average monthly rate of change (see Figure 1). Across the study period, statistically significant improvements were evident on all measures except for the ASEBA youth self-report. For example, in the analysis of the CAFAS, which consistently yielded the largest samples, youth served at the beginning of the study showed an average improvement of 1.1 points per month. By the end of the study period, youth showed an average improvement of 2.6 points per month. Thus, youth served during fourth quarter of fiscal year 2004 were predicted to improve more than twice as rapidly (2.57 / 1.05 = 2.5) as youth served during first quarter of fiscal year 2002. Stated another way, there was a 146% increase [(1.46 – 1.05) / 1.05] in the average rate of improvement over the course of the study. Similarly, analysis of the CBCL found that youth at the end of the study were expected to improve 3.7 times as rapidly (271% increase) as youth at the beginning of the study. Similar trends were evident in the TRF and CALOCUS analyses. Although significant, the CALOCUS results were not as well described by a linear model and tended to show are curvilinear pattern of less rapid improvement during fiscal year 2001, followed by more rapid improvement during 2003 and 2004. Youth did not report any significant difference in their rate of change, but showed stable improvement over the course of the study.

Proportion of Youth Showing Improvement

The second set of analyses examined the proportion of youth demonstrating an improving trend in their functioning, service needs, or symptomatology (see Figure 2). Statistically significant improvement over the course of the study was evident for the CAFAS, CBCL, and TRF, but not the CALOCUS or YSR. Analysis of expected values found that the CBCL showed the largest change (69.3% - 55.7% = 13.6%) and greatest relative increase (13.6% / 55.7% = 24.4%] over the study period, followed by the TRF (7% change; 14% increase), and the CAFAS (6% change, 10% relative increase). The CALOCUS again demonstrated a more curvilinear pattern of initial decline, followed by a return to initial proportion of improvement. The YSR fluctuated with no clear pattern of change over the study period.

Discussion

The majority of the evidence across measures completed by adults suggested that as the CAMHD system has developed in recent years, youth are improving at a significantly more rapid pace and that more youth are showing improvement at any given time. The present study does not elucidate the causes of this improvement, but these findings are consistent with the conclusion that CAMHD has been successful in its efforts to implement evidence-based services, continue developing care coordination practice, increase information feedback to stakeholders, adopt statewide performance measures, restructure quality improvement and practice-focused performance management processes, and improve utilization management.

At the end of the study period, the monthly average rate of change did not showed signs of continued improvement. This raises the question of how much gains might be expected before improvement rates "level out." To put this in the context, the average rate of change per month for evidence-based services may be used as a comparison (CAMHD, 2002). Examination of the biennial EBS report reveals that the average monthly rate of change varies by type of problem treated and the symptom specificity of the child status measure examined. When effect sizes are used to estimate expected change, treatments for disruptive behavior and willful misconduct (e.g., parent training and multisystemic therapy) show an average improvement equivalent to roughly 1 to 2 points per month on the ASEBA total problems scale. The comparable average rate of improvement in treatments for anxiety and depression was roughly 4 to 7 points per month on more narrow measures of the target symptoms (e.g., ASEBA internalizing scale). Although these estimates leave a wide range of expected values, they grossly suggest that the monthly average rate of improvement within the CAMHD system might yet have the range to more than double from the current rate at the end of the study period.

The present study does not report analysis of the stability of population characteristics over the study period, but relevant data is described elsewhere (cf., Daleiden, 2003). For example, Daleiden (2003) stated that for fiscal years 2001 to 2003 "With the exception of age, the demographic composition of the study population remained relatively stable across the period. Females accounted for 30% to 32% of the population and males for 68% to 70%. The five most prevalent ethnic groups in all three years were Multiethnic (26 – 27%), Native Hawaiian (23 – 25%), Caucasian (21 – 22%), Filipino (7 – 8%), and

Japanese (5%). The average age of youth decreased by approximately one year over the study period (15.6, 15.2, and 14.4 years) but the distributions remained relatively similar (e.g., SD = 3.7, 3.5, and 3.4) with a mild negative skew (-0.5 to -0.8).” In relation to diagnoses, Daleiden wrote “Examination of primary diagnostic trends suggested a fair degree of stability across the study period. The five most common primary diagnostic categories across the three-year period were attentional disorders (26 – 27%), disruptive behavior disorders (23 – 24%), mood disorders (18 – 22%), adjustment disorders (9 – 12%), and anxiety disorders (9%). The prevalence of primary mood disorders increased by 4% during the study period whereas the prevalence of adjustment disorders declined by 3%. Prevalence rates for all other primary diagnostic categories remained stable (< 1.5% change). Over the study period, the proportion of registered youth with one or more comorbid diagnoses increased from 57% to 65%.” Despite this evidence of a relatively stable population, the present analyses did not directly control for these variables and therefore the hypothesis that population changes may be associated with the observed child improvements should not be ruled out.

As previously noted, the present study is limited through its use of independent analysis of individual change and organizational change over time. Also, the current analytic model did not control for many potentially confounding client (e.g., gender, ethnicity, diagnosis, etc.) and organizational level variables (e.g., geographic distribution, level of care, etc.). This study also relied on all available data so that a sample of convenience was employed rather than a random sample. Nevertheless, despite these limitations, a consistent “signal” emerged through the “noise” across the adult report measures used in this study.

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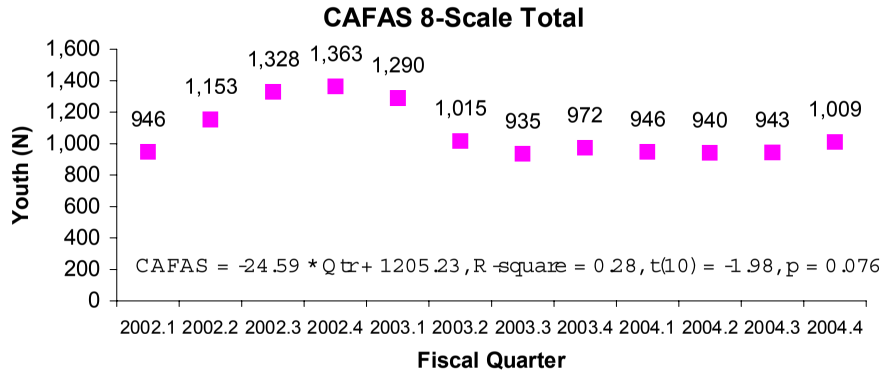
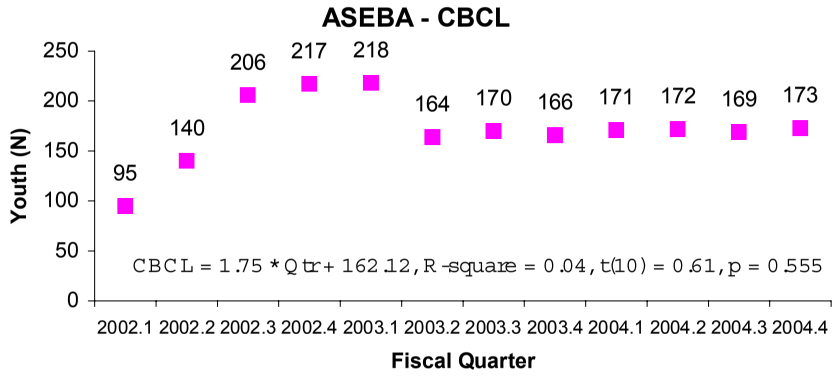
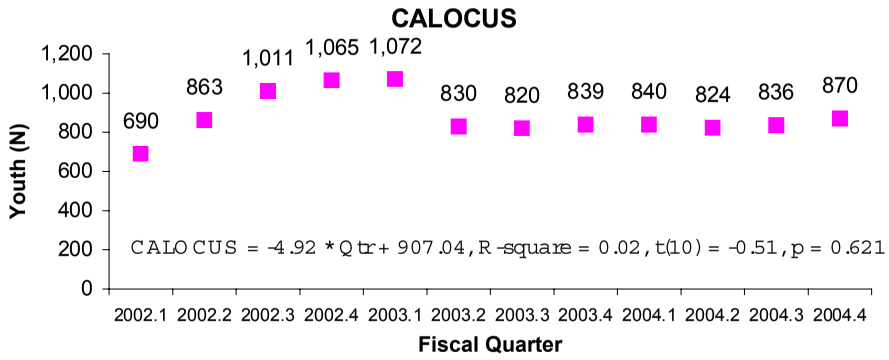
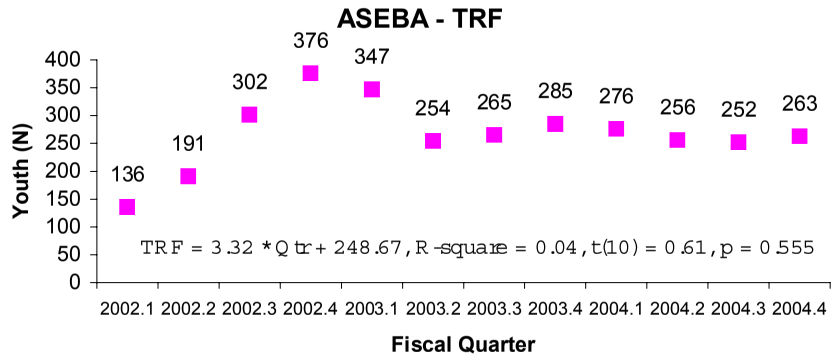
Figure 1: Sample Sizes (Number of Youth with Two or More Measures Completed) During Service Episode
For the Period of July, 2001 to June 30, 2004
as of June 30, 2004









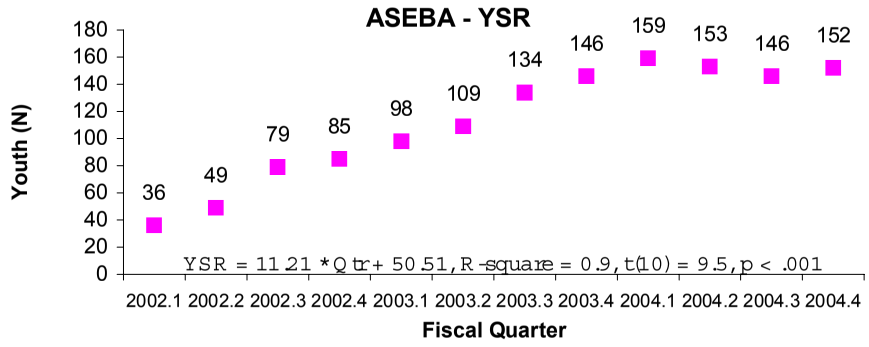
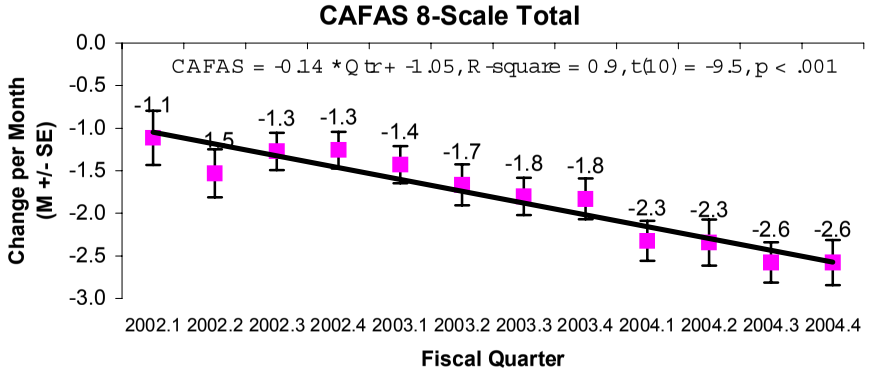
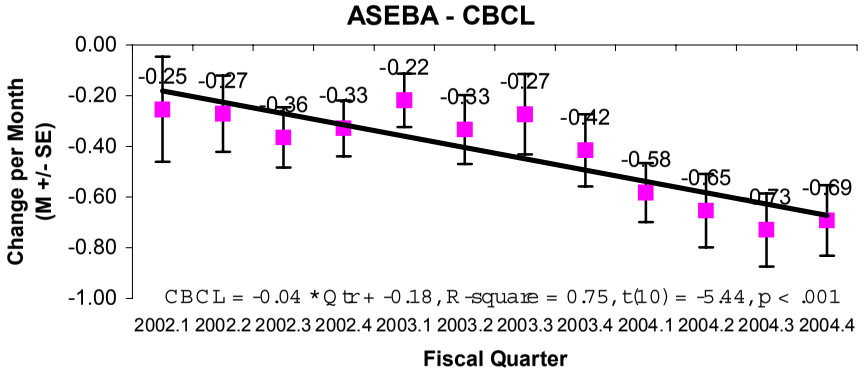
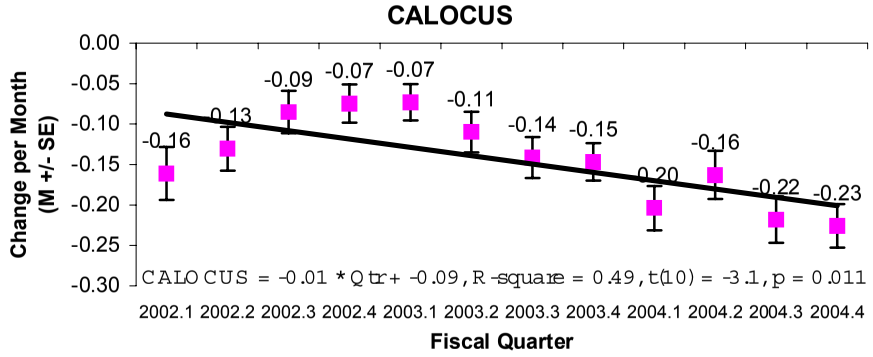
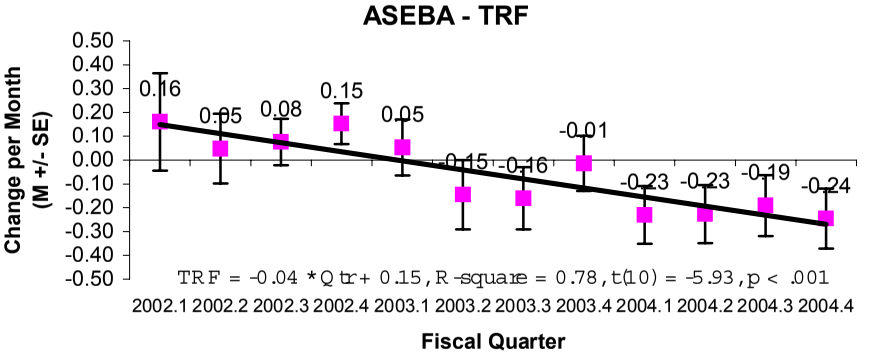


Figure 2: Average Monthly Within Client Slopes (I.e., Change per Month) During Service Episode For the Period of July, 2001 to June 30, 2004 as of June 30, 2004









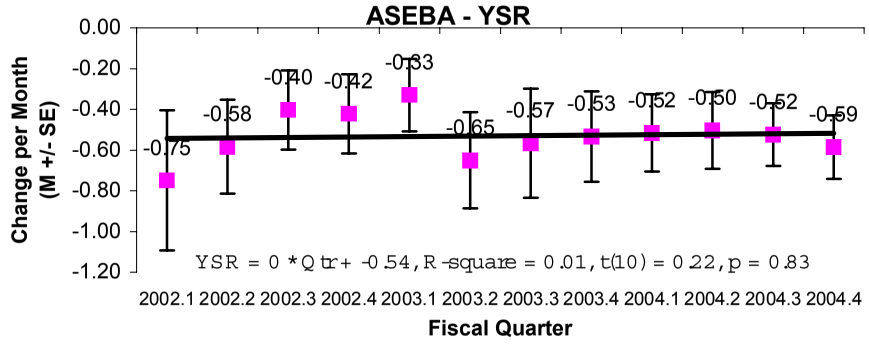


Figure 3: Percent of Youth Showing Improving During Service Episode
For the Period of July, 2001 to June 30, 2004
as of June 30, 2004